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Incentive Effects of Taxes on Capital Income

Taxes on the returns to capital may not be nearly as high as economists have believed. Earlier research by Martin Feldstein and others had concluded that the effective tax rate on past investment in the corporate sector was as high as 70 percent. A new study by NBER Research Associate **Don Fullerton** and **Yolanda K. Henderson** indicates that the total effective tax rate on new capital in the corporate sector is 30 percent and that the overall rate of taxation on all new capital is now around 26 percent.

Fullerton and Henderson come up with several other surprising findings as well. By their analysis, the effective tax rate actually is higher in the noncorporate sector than in the corporate sector, and marginal tax rates on capital apparently do not rise with inflation.

In **Incentive Effects of Taxes on Income from Capital: Alternative Policies in the 1980s**, *Working Paper No. 1262*, Fullerton and Henderson evaluate the Reagan tax changes to determine whether they are likely to have the intended effect of increasing saving, investment, and worker productivity. The amount of capital formation is influenced by the overall rate of taxation on capital income. However, many economists have also begun to focus on the effect of taxes on the allocation of capital. Differential tax rates on various types of investments tend to divert the allocation of capital away from its most productive uses, thereby reducing the value of total output. These efficiency costs can increase even when a tax change reduces the overall tax rate on capital.

Fullerton and Henderson compare six different tax systems in terms of their marginal effective total tax rates on capital in the corporate, noncorporate, and owner-occupied housing sectors, and in terms

of the distortions they create in the allocation of investment. The six tax systems are: (1) the tax law as it existed in 1980; (2) President Reagan's reforms as enacted in the Economic Recovery Tax Act of 1981 (ERTA); (3) the tax law after the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA); (4) the Auerbach-Jorgenson proposal for first-year write-offs of the present value of economic depreciation; (5) fully integrating the personal and corporate income taxes; and (6) eliminating the corporate tax.

To make the comparisons, they use cost-of-capital formulas to measure the required pretax rate of return for each of 38 assets under each of the tax regimes. Comparing these pretax rates of return with a fixed, real aftertax return yields an estimate of the effective tax rate on each asset. By weighting the different assets together, the calculations produce an overall tax rate, an overall cost of capital, and a standard deviation of the cost of capital across assets, for each tax system. The taxes included in the comparisons are state and local property taxes, corporate income taxes, and personal income taxes on dividends, capital gains, and interest income.

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Fullerton and Henderson come up with four rather surprising results. The first is the finding of a lower tax rate on capital than would have been predicted by earlier studies. Even under the 1980 tax law, the overall effective tax on capital in the corporate sector

is 34.5 percent, and the effective rate on all capital is 28.8 percent. The second surprise is that capital in unincorporated businesses is taxed more heavily than capital in the corporate sector. Any given asset is taxed more heavily in the corporate sector, but the overall tax rate is higher for unincorporated businesses because they use relatively more of the highly taxed assets such as land and buildings. Third, the authors find an effective tax rate on owner-occupied housing of 18.6 percent. This is contrary to the common perception that owner-occupied housing faces zero taxation because the imputed rental income is tax free. The tax rate on housing reflects local property taxes, which are much higher on housing than on business assets.

Fourth, it appears that the overall rate of taxation of capital income does not change with the inflation rate. Inflation adds to taxes in the corporate sector because of historic cost depreciation, taxation of nominal capital gains, and tax rules for insurance companies, but it also subtracts from total taxes because the corporate rate for nominal interest deductions exceeds the personal rate at which interest is taxed. Those effects apparently cancel each other out, so that the overall effective tax rate does not change. However, higher inflation may raise the excess burden imposed by the tax system. It raises the tax on depreciable assets and lowers the tax on other assets. Under the 1982 tax law, the standard deviation of the cost of capital across assets is about 1.5 percentage points when inflation is 5 percent or less; the standard deviation is one-fourth greater when inflation is 10 percent and twice as great at 15 percent inflation.

Fullerton and Henderson's results also indicate that the six tax regimes produce very different effects on the cost of capital and the allocation of investment. The 1980 tax law produced an overall cost of capital of 7 percent, with a standard deviation across assets of 1.7 percentage points. The 1981 tax cut, if it had become fully effective, would have cut the effective tax rate on corporate capital to 23.6 percent and the overall cost of capital to 6.6 percent. But it would have raised the standard deviation to 2.0 percentage points. Under the 1982 law, the cost of capital rises to 6.8 percent but the standard deviation drops back to 1.7 percentage points.

Integration of the personal and corporate taxes, with the investment tax credit and depreciation allowances passed on to shareholders, would not remove distortions across assets. But it would remove almost all the differences between the corporate and noncorporate sectors. These differences turn out to be quite important, because the standard deviation of the cost of capital falls to 0.9 percentage points. The overall tax rate is about the same as under the present system.

The Auerbach-Jorgenson plan would reduce the difference in tax rates across assets, cutting the standard deviation of capital costs to 1.4 percentage

points, but effective tax rates would rise by 9 percentage points in the corporate sector and 4 points overall. Eliminating the corporate income tax—but retaining personal taxes on interest receipts, capital gains, and dividends—raises the effective tax on corporate capital from 30 percent to 32.1 percent. This is consistent with other recent findings that the present tax system confers a *subsidy* on corporate investments. AE

Geographic Variation in Military Enlistments

Since the congressional decision in 1973 to end the draft and rely on voluntary enlistments, the U.S. Army has become vitally interested in what influences able young men and women to sign up for service. Is it higher pay and better educational benefits? Or do many enlistees join merely because it is hard to find a civilian job?

In recent years, the Army has been highly successful in attracting well-qualified recruits. Now, with unemployment beginning to fall, will the Army face more difficulty in obtaining these "high-quality" recruits? NBER Research Associate **Charles C. Brown**, in *Working Paper No. 1261, Military Enlistments: What Can We Learn from Geographic Variations?* indicates that indeed the recruiting task will become much tougher as the number of jobless declines.

Brown, looking at the recruiting experience and differing economic conditions from state to state, and from quarter to quarter, between fiscal years 1976 and 1982, finds that higher unemployment rates "had quite strong effects on recruitment success." At the mean unemployment rate of 7 percent during that time span, a 1 percent reduction in the jobless rate would reduce enlistments of high-quality recruits (those with military entrance test scores in the top half of the population, or top-scoring individuals who are also high school graduates) by about 10 percent.

This effect is larger than most previous estimates, many of which are based on time-series analysis of the supply of volunteers using information about enlistments over a period that includes the Vietnam War, the draft, and the post-Vietnam War experience. Brown finds several difficulties in such studies. One problem is measuring the impact of the draft on volunteers. Some who volunteered hoped to secure preferred assignments or wanted to join at a time convenient to themselves rather than to wait for the draft at a later time that might be less suitable for them.

Such estimates are further complicated by the period when there was a draft lottery. Another difficulty involves the lags in the response of enlistments to changes in military pay and to changes in civilian wages or the rate of unemployment. A fourth measurement problem is how to incorporate changes in educational benefits into total military compensation.

Other studies use a cross-section analysis, studying recruiting experience from state to state. The major disadvantage of a cross-section approach alone is the danger that unmeasured taste and ability factors will be correlated with civilian compensation. For instance, the historically greater propensity for southerners to enlist may be the result of lower civilian wage opportunities or to differences in "cultural" attitudes toward the military.

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By combining the time-series and cross-section approaches, Brown avoids some of these problems. His strategy has the main advantage that it provides samples of reasonable size without including observations that are burdened by draft-era complications. In essence, his approach looks at changes in each state over time that minimize problems caused by unmeasured tastes and abilities.

In order to make calculations of the impact of factors such as unemployment on enlistment, these factors must change at different rates in different states. Fortunately, Brown observes this in the data. For instance, the unemployment rate in the Northeast was 121.7 percent of the national unemployment rate in fiscal year 1976 and declined to 93 percent of the national jobless rate in fiscal year 1982. By contrast, the unemployment rate in the Midwest moved in the opposite direction—from 89 percent of the national average in 1976 to 114 percent in 1982. Relative unemployment remained roughly constant in the South. Recruiting measures show that over the time period, the Midwest replaced the South as the dominant per capita supplier of recruits to the volunteer army. Relative recruiting rates declined in the West, along with the relative unemployment rate.

Brown finds that an increase in military compensation relative to civilian pay has an elasticity of *about* one. That means that a 10 percent boost in military compensation (including fringes) relative to civilian compensation would lift recruitment of high-quality volunteers by roughly 10 percent.

Advertising in national media, Brown finds, sometimes has a positive effect on recruiting, but advertising in local media seems to have no detectable

positive effect. Additional Army recruiters also increase enlistments. But if the other services (Air Force, Navy, Marines) boost the number of their recruiters, this would cut into Army enlistments. If all services' recruiters were increased in the same proportion, then the number of Army enlistments would go up, Brown finds.

What should the Army do if declining unemployment reduces the quality of its recruits? Brown says the most obvious solution is to increase compensation for new enlistees. A subtler strategy, he writes, would be to focus on retention of those already in the Army, thereby reducing the number of high-quality enlistees who must be recruited. A third option is to expand the role of women. A final issue, he states, is whether the current number of high-quality recruits ought to be maintained, since that level was at least partly caused by the depth and length of the past recession. DF

Effects of Interest Rates on Mortgage Prepayments

Market interest rates are a significant determinant of the possibility of mortgage prepayment, according to NBER Research Associates **Jerry R. Green** and **John B. Shoven**. In *NBER Working Paper No. 1246, The Effects of Interest Rates on Mortgage Prepayments*, Green and Shoven study 4000 mortgages made in California and active in 1975 and 1976 to attempt to measure the extent of influence of market rates on mortgage duration.

When market interest rates rise, holders of fixed rate mortgages accrue a nominal capital gain (since their mortgage loans are then below the market rate) and they become less likely to prepay. The authors use the term "percentage lock-in," which they define as the ratio of this nominal capital gain to the value of the house.

On the other hand, the net worth of S&Ls who issued the mortgages falls because of the interest rate differential and the endogenous lengthening of the loans' duration. Rules regarding due-on-sale clauses also significantly affect the value of (S&Ls') mortgage portfolios, in some instances to a large enough extent to wipe out the S&L's net worth.

For due-on-sale fixed rate mortgages, on average a 23 percent lock-in would occur if interest rates suddenly rose from 10 to 15 percent. For fixed rate

assumable mortgages, the lock-in would be 28 percent because the effective maturity of the mortgage is longer.

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In a due-on-sale regime, the likelihood of prepayment depends on the relationship between the contractual rate on the mortgage and the market inter-

est rate. For example, a 10 percent lock-in reduces the probability of prepayment by about one-third. If the due-on-sale provision cannot be enforced, the probability of prepayment is reduced by 63 percent.

In the absence of any lock-in effects, the average time to repayment is 6 years. If interest rates suddenly rise from 10 to 15 percent, average time to repayment grows to 9 years for a due-on-sale mortgage and 13½ years for an assumable mortgage. If the market rate rises to 12 percent, a 10 percent mortgage with an enforceable due-on-sale clause will prepay in over 7 years (up from the average 6 years). If the same mortgage is assumable, the average time to repayment will rise to over 10 years.

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