Economics 230a, Fall 2013
# Lecture Note 10: Saving and Portfolio Responses to Taxation: Introduction

Until now, our discussions of capital income taxation have treated saving as a single activity and assumed that any taxes imposed on capital income are applied as the income accrues. In reality, many types of assets serve as vehicles for saving, and the taxes imposed on saving often vary by asset (e.g., debt vs. equity vs. housing) or purpose (e.g., short-term saving vs. retirement saving). Also, the method of imposing taxes on capital accumulation varies, including taxation on accrual of income but also taxation on sale of assets (in the case of capital gains) or death (in the case of estate and inheritance taxes). Heterogeneity of tax treatment means that there are potential behavioral responses to taxation other than simply in the amount saved, and that questions of incidence and efficiency are also more complicated. Observed responses to the taxation of saving often reveal patterns of behavior that deviate from simple models of rational choice, deviations that affect not only the responses to policy but also the design of optimal policy.

Taxation and Portfolio Choice

Under a progressive income tax, some individuals may have higher marginal tax rates than others on capital income. This difference in marginal tax rates may affect the level of individual saving, but will it affect the *composition* of saving, in terms of assets? There are two potential reasons why the composition of assets, i.e., the individual portfolio choice decision, may be influenced by taxation. The first is that not all assets are taxed at an individual's normal tax rate. The second, discussed below, is that taxes affect not only expected returns, but also the riskiness of returns. For a variety of reasons, some assets may be <u>tax favored</u>, that is, face a lower rate of tax than the individual's regular marginal tax rate. An important example is assets that deliver their income in the form of capital gains, which are taxed less heavily than other income in most countries. In the United States since 2003, lower tax rates also apply to dividends, so that all income from investment in equity, both dividends and capital gains, is tax favored relative to that coming from fully taxed assets, such as debt issued by companies or by the federal government.

To understand the impact of the existence of tax-favored assets, suppose there are two assets that are perfect substitutes from an investor's perspective except in the way they are taxed. Income from debt (i.e., interest) is taxed at the taxpayer's full rate of tax, θ, while income from equity is taxed at rate $\lambda\theta$, where $0 < \lambda < 1$. If r^d and r^e are the before-tax returns to debt and equity, then
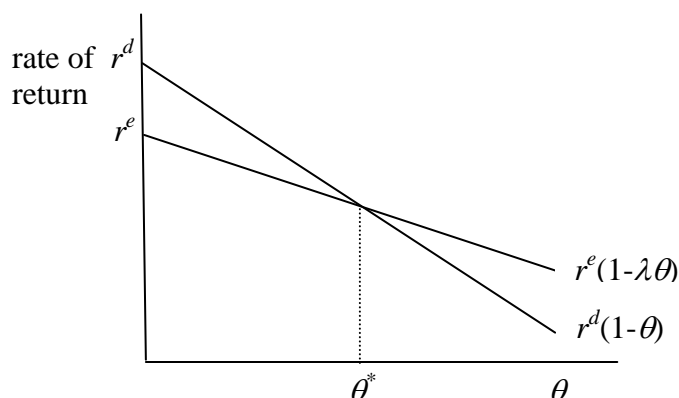
the relative returns for investors are as shown in this graph. Investors regular tax rates above θ^* will prefer equity, those with lower tax rates will prefer debt, and those at θ^* will be indifferent. Thus, we'd expect tax-favored assets to end up in the portfolios of high-bracket investors. If we added a third asset that is even more tax-favored, for example municipal debt, which is tax exempt, the picture would look like:
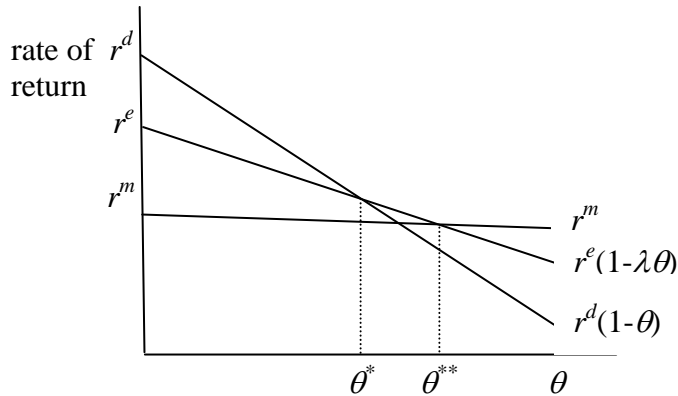
There will now be three groups of investors: those in the highest brackets, above θ^{**}, holding municipal debt; those between θ^* and θ^{**} holding equity; and those below θ^* holding taxable debt.

Note that we have drawn the graphs assuming that the more tax-favored the asset, the lower its before-tax rate of return. This must be true if positive amounts of all three assets are to be held. Otherwise, all investors would prefer tax-favored assets.

This translation of tax-favored status into lower before-tax rates of return is another illustration of tax capitalization, in this case the capitalization of tax benefits. For the marginal investor on the borderline between two assets, the tax benefits of the more lightly taxed asset are just offset by the asset's higher price (i.e., lower before-tax rate of return). How much before-tax rates of return differ depends on the relative asset supplies. For example, if the supply of municipal debt were reduced, then a higher value of θ^{**}, with fewer investors holding municipal debt, would clear the market for municipal debt. Put another way, in this model the tax benefits that are capitalized are those of the marginal investor, whose identity depends on asset supplies. Note that in this model the incidence of taxation comes in two components, through capitalization and direct taxation. For example, individuals who hold equity bear some tax through a lower rate of return than on debt, and some through their own (favorable) taxation of equity returns. Individuals who hold municipal debt bear taxes only indirectly, through capitalization.

This characterization of tax-induced portfolio choice is unrealistic in predicting that each individual will specialize in a particular asset, because assets typically differ in another dimension as well – their risk profiles. Differences in risk tolerance and a desire for portfolio diversification will also influence portfolio choice, and there will also be an interaction between taxation and risk, because taxes tend to dampen return fluctuations – after-tax returns have a lower variance than before-tax returns.

Taxation and Risk-Taking
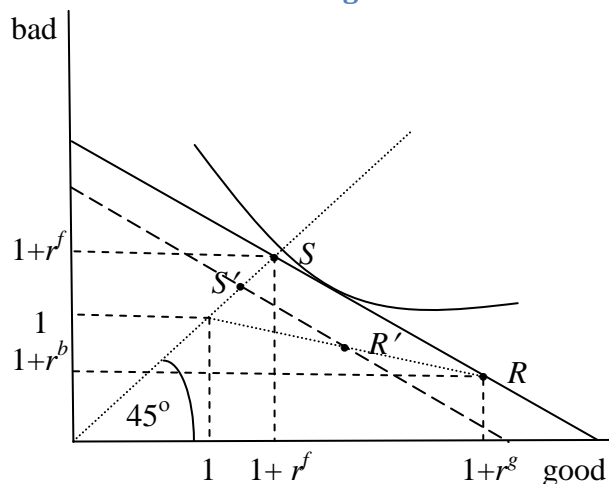
To consider the effects of taxation on investment in risky assets, consider a model in which there are two states of nature ("good" and "bad") and two assets, one safe (S), with return r^f in both states, and one risky (R), with returns $r^g > r^f$ and $r^b < r^f$ in the good and bad states. (Note that risk aversion requires that in equilibrium the expected return on the risky asset exceeds that on the safe asset.) The two assets together define the budget line as shown, and the tangency illustrated in the figure corresponds to a portfolio with positive holdings of both assets.

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If income taxes at a single rate are imposed on all returns, this will contract the points R and S toward the point $(1,1)$ on the 45° line and lead to a parallel shift in the budget line and the new points R' and S' as shown, with relative asset demands influenced by an income effect. However, taxes may also affect the slope of the budget line; assuming that the risky asset is equity and the safe asset is debt, lower individual taxes on equity income would favor the risky asset, but capitalization of the generally more favorable equity taxation into lower before-tax equity returns would favor debt. Which effect dominates depends on whether the individual is a low-bracket or a high-bracket taxpayer (i.e., has a value of θ below or above θ^{*} in the first figure above). As a consequence, a substitution effect will push higher-bracket taxpayers toward holding more of the risky asset, and will push lower-bracket taxpayers toward holding less, but diversified portfolios will still be in order. How much of each asset is held will also be affected by risk aversion. For example, an infinitely risk-averse investor would have Leontief indifference curves with a kink-point on the 45° axis, and hence would hold only the safe asset. A risk-neutral investor, on the other hand, would have straight-line indifference curves and choose to hold only the asset with the higher expected after-tax return.

Two other important points are worth making at this point about taxation and risk-taking, both of which can be related to the above two-state figure:

(1) Tax systems typically treat gains and losses asymmetrically. While positive income is taxed, negative income (i.e., losses) does not receive a full tax refund. This means that the before-tax return on the risky asset in the good state may be $(1-\theta)r^{g}$, while the before-tax return in the bad state may simply be r^{b}, if $r^{b} < 0$, as is the case in the above figure. This would cause point R to shift horizontally to the left under taxation, to a point directly below R', and hence to steepen the budget line and discourage investment in the risky asset.

(2) Taxing risky assets reduces both expected returns and risk; the former discourages investment in risky assets, while the latter makes them more attractive. In one special case, the latter effect must dominate. Suppose that the tax system does not tax capital income generally, but just the excess over the safe rate of return, $(r^{g}-r^{f})$ or $(r^{b}-r^{f})$. Also assume that the tax system is symmetric, so that the issue just discussed does not arise. Then in the above two-state figure, taxation does not move point S, and simply shifts point R along the original budget line toward point S. For example, if the tax rate is 50%, R will move half-way from its original position to S. This does not change the investor's budget line, but must increase the portfolio share held in the risky asset. That is, a tax on *excess returns* – returns to risk-taking in excess of the safe rate of return – reduces a risky asset's expected return but in a way that does not change the investor's options and that encourages risk-taking. (A corollary is that the expected tax payment, which is positive because the expected before-tax return on the risky asset exceeds that on the safe asset, is of zero value to the investor and imposes no burden.) While this encourages private risk-taking, it also increases the risk borne by the government, unless the government can pool the risks of individual tax payments; the distribution of that risk by the government to individuals may in turn reduce investor risk-taking (since they will already have some risk in their lives) and might even undo the initial increase in risk-taking, a point made by Gordon (*QJE* 1985).

Evidence on the influence of taxes on portfolio choice is somewhat mixed but generally consistent with the theory that taxes should influence the mix of assets held; see Poterba (pp. 1126-1131). A recent application is in the paper by Kawano, which studies the impact of the 2003 reduction in the US rate of dividend taxation, mentioned above. The effect of the legislation was not only to make equity more attractive, relative to other assets, but also to increase the attraction of equities with high dividend yields (and hence a larger share of their income coming in the form of dividends, relative to capital gains) relative to equities with low dividend yields, especially for investors in higher tax brackets. Thus, we should have expected higher bracket investors, relative to low-bracket investors, to shift their portfolios more toward high-dividend-yield stocks. In terms of the simple two-asset graph above, we can imagine the two assets being high-yield and low yield stocks, with the tax rates on both stocks depending on the individual's ordinary tax rate, θ, but with high-yield stocks facing a higher tax rate, since dividends face a higher tax rate than capital gains prior to 2003. (Even after 2003, other provisions make the effective capital gains tax rate somewhat lower than the dividend tax rate.) The 2003 legislation lowers the tax rate on both assets, but it lowers the tax rate more for high-yield stocks, a relative benefit most valuable for those in high brackets.
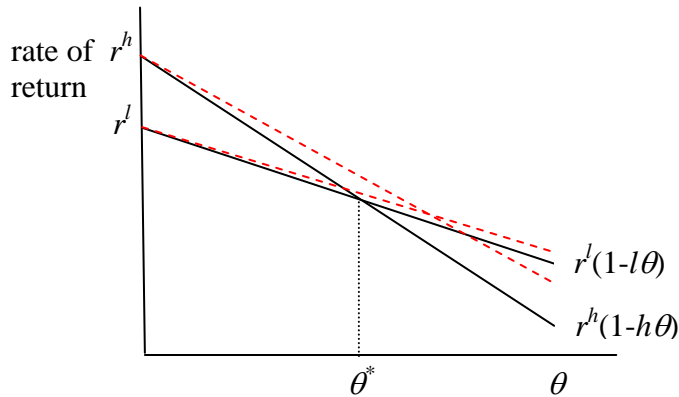
As shown in the graph to the left, this change shifts the point of indifference to the right, given no change in before-tax returns. (We might also expect the before-tax return on high-yield stocks, r^h, to fall relative to that on low-yield stocks, r^l.) Indeed, Kawano finds a shift in portfolio sorting, with higher-bracket investors shifting more strongly toward high-yield stocks than low-bracket investors.