University of Southern California GSBA 549
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Notes on Taxes and the Labor Market

The simplest tax is a lump-sum tax, and for many years most macroeconomic analyses (including the simple Keynesian model) implicitly assumed that taxes were lump sums. With a lump-sum tax, a household's tax liability is simply a fixed sum and does not vary as the household's behavior changes. Most actual taxes are not lump sums. Rather, tax bills are calculated by multiplying some tax base by a corresponding tax rate (or by a set of tax rates that may vary with the size of the tax base). Different taxes may have different tax bases. These include income from wages and salaries; income from interest, dividends, and profits; consumption expenditures, and real property values. A household generally has some control over its tax base. By reducing its tax base, the household can reduce its tax liability. The higher the tax rate, the stronger the incentive to reduce one's tax base. Thus, actual taxes exert substitution effects that distort economic behavior, encouraging people to reduce those activities that lead to increased tax liabilities. These substitution effects are sometimes referred to as the "supply-side" effects of taxes.

These notes show how distorting taxes fit into a simple neoclassical macroeconomic model and discusses the economic effects of such taxes.

Three Types of Taxes

Most taxes can be thought of as taxes on labor income, taxes on income from capital, or consumption taxes. These taxes change people's behavior by altering their budget constraints. For simplicity, consider an individual who lives for two periods, receives income from working in each period, and consumes goods and services in each period. For the moment, assume that the government gives the individual nothing in return for tax payments. The individual's budget constraint is

$$c_1(1+\tau_c) + \frac{c_2(1+\tau_c)}{1+r(1-\tau_k)} = wn_1(1-\tau_l) + \frac{wn_1(1-\tau_l)}{1+r(1-\tau_k)}$$

where c_t is consumption in period t, n_t is labor in period t, w is the before-tax real wage rate, r is the before-tax real interest rate, τ_c is the tax rate on consumption, τ_l is the tax rate on labor income, and τ_k is the tax rate on income from capital. For simplicity, the wage, interest, and tax rates are assumed to be constant over the two periods. The taxes on income from labor and capital are taken out of the individual's before-tax income, whereas the consumption tax is added on to the individual's before-tax consumption expenditure.

The left-hand side of this budget constraint is the present value of the individual's consumption, and the right-hand side is the present value of earnings. Notice that these present values are computed using the after-tax interest rate $r(1-\tau_k)$. Consider how each of the three taxes affects the individual's budget constraint and how the individual might react to each of the taxes.

1). Given r, an increase in τ_k lowers the after-tax interest rate, thereby affecting the individual's intertemporal allocation of resources. A higher τ_k means a lower price of current consumption and leisure relative to future consumption and leisure. We might expect the individual to react to a higher τ_k by consuming more, working less, and saving less in period one.

2). Given w, an increase in τ_l lowers the after-tax wage rate, reducing the price of leisure relative to consumption. If τ_l is the same in the two periods, it does not affect intertemporal choices. We might expect the individual to respond to an increase in τ_l by working less and consuming less in each period.

3). Perhaps the least intuitive result is that a consumption tax, τ_c, acts exactly like a tax on labor income, τ_l. Analytically, we can see this by dividing both sides of the budget constraint by $(1-\tau_c)$ to get

$$c_1 + \frac{c_2}{1+r(1-\tau_k)} = wn_1\left(\frac{1-\tau_l}{1+\tau_c}\right) + \frac{wn_1\left(\frac{1-\tau_l}{1+\tau_c}\right)}{1+r(1-\tau_k)}.$$

Consider first a tax structure with $\tau_l = 0.2$ and $\tau_c = 0$. Substituting these tax rates into the previous equation, we see that this labor income tax gives a budget constraint of

$$c_1 + \frac{c_2}{1+r(1-\tau_k)} = wn_1(0.8) + \frac{wn_1(0.8)}{1+r(1-\tau_k)}.$$

Alternatively, consider a tax structure with $\tau_l = 0$ and $\tau_c = 0.25$. This consumption tax gives exactly the same budget constraint as the labor income tax. From the point of view of lifetime resources available to the individual, it does not matter whether the government collects its taxes when people receive their earnings or when they spend them. Because the two taxes result in the same budget constraint, they have exactly the same effect on individual behavior. Thus, we have a "theorem" which states that there exists a consumption tax that is exactly equivalent to any labor income tax, and vice versa. The important distinction is not between income and consumption taxes, as is commonly thought, but between taxes on labor income and taxes on income from capital. Consequently, we will consider only these latter two taxes from now on.[1]

[1] Although a newborn should be indifferent to facing a labor income tax or the equivalent consumption tax over the entire life cycle, individuals would not be indifferent to switching from one tax to the other in midstream. Consider the effects of switching from a labor income tax to a consumption tax. Older individuals have already paid a tax on their earnings and have set aside some of their after-tax earnings to finance consumption during retirement. Those individuals would now be required to pay an additional consumption tax when they consume their savings.

Effects of a Labor Income Tax

As we noted above, an increase in the labor income tax causes a substitution effect away from work effort (and the consumption that work effort makes possible) and toward leisure. It does this by lowering the after-tax wage rate, which is the equivalent of the after-tax MPL in our simple Robinson Crusoe model. In that model, we saw that a downward shift of the production function that lowers the MPL has an income effect as well as a substitution effect. The income effect tends to make people work more, and the net effect on work effort is uncertain.

The income effect resulting from an increase in the labor income tax rate depends on what the government does with the resulting tax revenue. If the government uses the revenue to provide transfer payments to those who pay the taxes or to provide them with services they otherwise would provide for themselves, there is no income effect. In such a case, a labor income tax has only a substitution effect that discourages work effort.[2] If the government wastes the tax revenue, then a labor income tax has both an income and a substitution effect, and the net effect on work effort is unclear.

Tax Rates and Tax Revenues

An increase in the tax rate on an activity lowers the amount of that activity, which is known as the tax base. Revenue increases if the percentage reduction in the tax base is smaller than the percentage increase in the tax rate. Revenue falls if the percentage reduction in the tax base is larger than the percentage increase in the tax rate.[3] Starting from a tax rate of zero, revenue at first increases as the tax rate increases and eventually reaches a maximum. Further increases in tax rate then lead to a reduction in revenue. This relation between tax rates and revenues is known as the Laffer Curve, and it applies to the tax on any activity including work in the market sector.

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[2] If an individual's transfer payment declines as the individual's labor income increases, then the transfer payment also has a substitution effect that discourages work effort.

[3] Be careful to notice that these statements refer to the percentage increase in the tax rate, not to the percentage-point increase. For example, if a tax rate increases from 10% to 15%, this is called a 5 percentage-point increase in the tax rate. It is also called a 50% increase in the tax rate, but not a 5% increase.