

Ricardian Equivalence without Graphs

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Theorem: *If taxes are lump-sum, and the government pays the same interest rate as private borrowers, then for a given stream, or sequence, of government purchase (G_t) the choice between taxes and borrowing has no effect on consumption or the real interest rate.¹*

For example, a tax cut of 100 will have no effect on consumption or national savings. One definition of national savings is

$$S_t = Y_t - G_t - C_t \quad (1)$$

Since Y and G are constant and C is unchanged, there is no shift in the national savings curve. Therefore, nothing happens in the aggregate credit market and the real interest rate remains the same. Although government saving decreases by 100, this is exactly offset by an increase of 100 in household savings.

Consumption does not change because it is a function of the present value of current and future disposable income.

$$PV(Y_t - T_t) = (Y_1 - T_1) + \frac{(Y_2 - T_2)}{1+r} \quad (2)$$

Recall that from the governmental inter-temporal budget constraint, we get

$$-\Delta T_1 = (1 + r)\Delta T_2.$$

Since the present value of the current tax cut is equal to the present value of the future tax increase necessary to pay off government debt, there is no change in the present value of disposable income (i.e. the household budget line does not shift).

An important policy implication is that temporary tax cuts or tax rebates are completely ineffective in ‘stimulating’ consumption.

Another implication of Ricardian equivalence is that what matters in the aggregate credit market is government *purchases*, not government *borrowing*. Suppose the government increases purchases by 100, and that the interest rate and preferences are such that households respond by reducing current consumption by 40. Households are reacting to the lower present value of current and future income. Using equation (1) this means national savings decreases by 60. The decrease in consumption and national savings—as well as the increase in the interest rate—are the same regardless of whether the government uses taxes or borrowing to pay for G .

¹ There are some other conditions as well.

Case 1: Higher G through Taxes

Government savings remains the same but household savings decreases by 60. To decompose this decrease, use the definition of household savings,

$$S_1^{HH} = Y_1 - T_1 - C_1. \quad (3)$$

Current taxes increase by 100, but current consumption decreases by 40 as previously stated. The decrease in C is less than the decrease in current disposable income because households want to transfer some of the pain of higher current taxes into the future.

Case 2: Higher G through Borrowing

Government savings decreases by 100 but household savings increases by 40. Using equation (3), there is no change in current income or taxes but current consumption decreases by 40. The reduction in current consumption transfers some of the future pain of the coming tax increase into the present.

Crowding Out:

The term “crowding out” is used by many to refer to government borrowing crowding out private borrowing (Government bonds substituting for corporate bonds.) In contrast, the crowding out that occurs in this framework is physical rather than financial: government purchases crowd out private consumption and investment. Resources allocated to the production of tanks, bridges and public schools, could have been allocated to the production of factories, machines, cars, food and music.

Exercise:

Suppose the interest rate paid by the government is less than that paid by private agents. Now what happens when the government cuts taxes in period one (i.e. a temporary tax cut or tax rebate) without a change in government spending?