

## Problem set 2

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### Exercise 1

In problem set 1, Question 4, you were supposed to contrast effects of *permanent* and *temporary* changes in government consumption  $G$ . Does Ricardian equivalence hold in this setting?

### Exercise 2 (Williamson, Chapter 8, Problem 5)

Suppose that the government introduces a tax on interest earnings. That is, borrowers face a real interest rate before and after the tax is introduced, but the lenders receive an interest rate of  $(1 - x)r$  on their savings, where  $x$  is the tax rate.

- (i) Show the effects of the increase in the tax rate on a consumer's two period budget constraint.
- (ii) How does the increase in the tax rate affect the optimal choice of consumption and saving for the consumer? Show how income and substitution effects matter for your answer, and show how it matters whether the consumer is initially a borrower or a lender.

### Exercise 3 (Williamson, Chapter 8, Problem 8)

Consider a two period model of consumption. Assume a consumer who has current-period income  $y_1 = 200$ , future period income  $y_2 = 150$ , current and future taxes  $T_1 = 40, T_2 = 50$ , respectively, and faces a market real interest rate of  $r = 5\%$ . The consumer would like to consume equal amounts in both periods; that is, she would like to set  $c_1 = c_2$ , if possible. However, the consumer is faced with a credit market imperfection, so she cannot borrow at all.

- (i) Show the consumer's lifetime budget constraint and the indifference curves in a diagram.
- (ii) Calculate her optimal current-period and future period consumption and optimal saving, and show this in the diagram.
- (iii) Suppose that everything remains unchanged, except now  $T_1 = 20$  and  $T_2 = 71$ . Calculate the effects on current and future consumption and optimal saving and show this in the diagram.
- (iv) Suppose alternatively that  $y_1 = 100$ . Repeat parts (i)-(iii) and explain any differences