

**Homework Problem Set 1:**  
**Graduate Public Finance**  
**Professor Hungerman**

1. In 2008 Mike Huckabee proposed a “Fairtax” that would, for the purposes of this problem, basically be a flat 30% sales tax on commodities. (The tax would also have a reimbursement component but let us put that aside.) In the context of the Ramsey model, discuss how a 30% tax on everything would deviate from an optimal commodity tax structure.

2. Prove that in the Ramsey model, if cross price effects are zero, then the optimal tax-price expression simplifies to  $\frac{t_k}{t_k + p_k} = \left[ \frac{\alpha - \lambda}{\lambda} \right] \frac{1}{\varepsilon_k^d}$ . (Hint: don't try to do this by imposing zero cross-price effects at the solution to the problem. Instead impose zero cross-price effects at the first-order condition and go from there.)

3. Suppose a consumer has utility  $u(x_1, x_2, x_3) = \ln x_1 + 2 \ln x_2 + x_3$ . Their budget constraint is  $I = q_1 x_1 + q_2 x_2 + x_3$ . This consumer's optimization problem is:

$$\max_{x_1, x_2, x_3} \ln x_1 + 2 \ln x_2 + x_3 + \lambda(I - q_1 x_1 - q_2 x_2 - x_3)$$

Verify that at the optimum  $\frac{\partial V}{\partial I} = \lambda$ , where  $V$  is the indirect utility function.

4. How can you interpret  $\lambda$  in the solution to the Ramsey rule? How is it different from  $\alpha$ ? Can you think of reasons for why  $\lambda$  would be bigger than  $\alpha$ ? What if they were equal?