Problem 2: Efficiency Cost of Non-Salient Taxes with Debiasing

For this problem, we will consider a model of commodity tax salience similar to the one covered in the lecture. Suppose consumers have preferences over taxed good x and untaxed good y. The price of x is $p + t_s + t_u$ where p is an exogenous producer price, t_s is a salient tax and t_u is an unsalient tax. The consumer has preferences represented by

$$U(x, y) = \alpha x - \frac{\beta}{2}x^2 + y$$

Suppose initially that the consumer pays attention only to the salient tax, that is the *perceived* price is $p + t_s$. The consumer chooses x according to the perceived price and adjusts y to satisfy the budget constraint given an endowment w. For simplicity, you may ignore the non-negativity constraints on x and y.

1. Derive the demand for x and y in terms of w, p, t_s, and t_u.

2. Starting from the point where $t_s = t_u = 0$, derive the excess burden accompanying the introduction of 1) a salient tax and 2) an unsalient tax.

3. Using your answer to the previous part, derive the total excess burden for any two tax rates t_s and t_u. Illustrate in a graph of demand and supply.

4. Derive the marginal excess burden of an increase in either t_s or t_u. Illustrate these in two separate graphs (one for a change in t_s and one for a change in t_u).

5. Let $G(.)$ denote the difference between welfare under attention and welfare under inattention, i.e. the gain to optimizing, $G(x)$. That is, compare indirect utility under inattention to the salient tax to indirect utility under full optimization. Derive $G(.)$ and illustrate it in a graph. Discuss the comparative statics of $G(.)$, especially with respect to t_u.

6. Now suppose that there is a cost of attention γ. The consumer pays attention to the low-salience tax and fully optimizes when $G > \gamma$, and is otherwise inattentive (and behaves according to what you derived in part 1). For simplicity, suppose that $t_s = 0$ from now on. Show that there is a cutoff $\hat{t}$ such that the consumer pays attention iff $t_u > \hat{t}$. How does $\hat{t}$ depend on γ?

7. First suppose that γ is homogeneous. What happens to total excess burden if we increase the tax rate from just below $\hat{t}$ to just above it? How does your answer depend on whether γ is a real welfare cost? In the latter case, utility is given by $U(x, y) - \gamma a$ where $a \in \{0, 1\}$ indicates paying attention to the low-salience tax.

8. Now suppose that γ varies in the population according to a cdf $F(\gamma)$. Derive total excess burden of some tax t_u and marginal excess burden of an increase in t_u starting from a given positive rate.

9. Suppose the support of γ is bounded above by some value $\overline{\gamma}$. Show that there must be a point at which a marginal increase in the unsalient tax t_u has a larger marginal excess burden than a marginal increase in the salient tax t_s (starting from $t_s = 0$). Hint: draw a graph!

10. In 2011, Raj Chetty testified to the US Senate Finance committee about tax salience. After reviewing the new literature on tax salience, he gave the following policy reccomendation:

    "*Minimize the salience of negative incentives.* Some taxes are needed purely for revenue collection. For instance, income taxation raises revenue but may reduce labor supply or the growth of small businesses. While the government should never hide taxes, increasing the salience of such negative incentives is less desirable from the perspective of maximizing economic effciency and growth."

    What caveats would you attach to this statement?

11. Describe a real-world test that would give us some insight into whether and at what tax rates debiasing happens in the real world. (It is of course permissible to be somewhat vague here.)