Dynamics of Investment in Response to a Temporary $\tau \uparrow$ in the q Model.

Answer the following questions using an Abel (1981)-Hayashi (1982) **q** model of investment.

You are expected to answer the questions not just quantitatively (e.g., with figures or numbers) but also conceptually. That is, you must explain, in intuitive terms, *why* the variables do what they do.

1. Leading up to date t, the economy is in steady state. At date t, the government unexpectedly introduces a permanent increase in the corporate tax rate, $\tau \uparrow$. Show the effects on a phase diagram and show dynamics of investment, capital, share prices, and **q** following the tax change. In particular explain what, if anything, happens to λ, the share price of the firm, when the τ is implemented.

2. Leading up to date t, the economy is in steady state. At date t, the government unexpectedly introduces a *temporary* increase in the corporate tax rate, $\tau \uparrow$. The high τ will last for two years, and then the τ will revert back to its normal level. Show the effects on a phase diagram and show dynamics of investment, capital, share prices, and **q**, and the capital stock under two scenarios: (1) costs of adjustment for the capital stock, ω, are high; (2) costs of adjustment are low. EXPLAIN your results.

3. Leading up to date t, the economy is in steady state, and a τ of 20 percent has existed since the beginning of time. At date t, the government unexpectedly *announces* that in three years (that is, in year $t+3$), there will be a *permanent* decrease in the corporate tax rate, $\tau \downarrow \bar{\tau}$. Show and explain the effects on a phase diagram and show dynamics of investment, capital, share prices, and **q**, and the capital stock under two scenarios: (1) costs of adjustment for the capital stock, ω, are high; (2) costs of adjustment are low. EXPLAIN your results.

4. Do your results have any implications for whether, when lawmakers introduce a bill to increase the corporate tax rate, they will want to make it 'retroactive' (that is, if the τ change ever passes, it would apply to profits made during the period between the introduction of the bill and its passage into law). Is this the same as or different from the implications for the ITC?

5. How would your results to the previous question change if corporations had some accounting tricks they could use, at a smoothly convex increasing cost, to shift "reported" profits between calendar years? (By smoothly conves increasing costs, we mean costs like those for investment in the q model; that is, the marginal cost to move a negligible amount ϵ of reported taxes between t and $t+1$, is tiny (proportional to ϵ^2). (You do not need to make diagrams or do quantitative analysis for this question; intuition is enough).

References

ABEL, ANDREW B. (1981): "A Dynamic Model of Investment and Capacity Utilization," *Quarterly Journal of Economics*, 96(3), 379–403.

HAYASHI, FUMIO (1982): "Tobin's Marginal Q and Average Q: A Neoclassical Interpretation," *Econometrica*, 50(1), 213–224, Available at http://ideas.repec.org/p/nwu/cmsems/457.html.