

Advanced Macroeconomics

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Tutorial 7b: More on Growth Theory

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1. Differentiated Goods

What is the optimal consumption level for households in the Differentiated Goods model, with a continuum of varieties?

2. Budget Constraints

Derive the nominal budget constraint ($\dot{a} = ra + w - pc$) for a household with only one asset available (in continuous time). What is the interest rate? (*Note here, you will need to start with the time derivative of a : \dot{a} .*)

The general procedure is:

- *Step 1*: define savings, specifying wealth with all relevant prices and incomes.
- *Step 2*: compute the accumulation of wealth (first difference) from t to $t+1$.
- *Step 3*: relate current (i.e. at t) savings to current changes (from t to $t+1$) in capital.
- *Step 4*: rearrange to obtain a difference equation (differential equation in continuous time), and find the interest rate, r .

3. Intertemporal Elasticity of Substitution

(a) Why is intertemporal elasticity of substitution constant in: $(c^{1-\sigma} - 1)/(1 - \sigma)$? (*See lecture notes*)

(b) What is the limit of $(c^{1-\sigma} - 1)/(1 - \sigma)$, as σ tends to 1 (use l'Hôpital's rule)? Graph what the function would look like (*approximately*), for increasing levels of σ

Reminder: l'Hôpital's rule says that if $\lim_{x \rightarrow c} f(x) = \lim_{x \rightarrow c} g(x) = 0$, and $\lim_{x \rightarrow c} \frac{f'(x)}{g'(x)}$

exists, then $\lim_{x \rightarrow c} \frac{f(x)}{g(x)} = \lim_{x \rightarrow c} \frac{f'(x)}{g'(x)}$.