Economics 317 Section A: Spring 2017

Pre-Midterm Exam

Printed Name: KEY

My signature below signifies my commitment to "***uphold and model the FSB values of integrity, respect, and responsibility***" during the course of this exam.

Signature: _____

Intermediate Macroeconomic Theory
Economics 317: Section A
Pre-Midterm Exam: Spring 2017

Directions: ***Please answer all questions. Your answers should be as thorough and as precise as possible. If necessary you may continue your answer to any question at the back of the page.***

This exam is based on the following description of 317land. 317land is a monetary economy in which the typical household has production opportunities summarized by the production function $y_t = f(l_t)$. In addition, households have access to a competitive commodity or goods market and to a perfect credit or bond market. The bonds in 317land are one period bonds that pay real interest at rate R. Assume that the typical household in 317land has an infinite planning horizon and seeks to maximize horizon-long utility given by $U = u(c_1, l_1) + 1/(1+\rho)\, u(c_2, l_2) + 1/(1+\rho)^2\, u(c_3, l_3) + \ldots$, where c and l represent consumption and work effort and ρ is the subjective rate of time preference. Finally, assume that households in 317land behave in accordance with the permanent income hypothesis.

1. In class we noted that in order to maximize horizon-long utility households in an economy like 317land will have to allocate resources optimally along three dimensions. These are: the intratemporal allocation of resources, the intertemporal allocation of consumption, and the intertemporal allocation of work effort. Fundamental economic principles instruct that optimizing households' allocation of resources should be guided by the following principles.

   (i) Pick the optimal level of any good, service, or activity by equating marginal benefit to marginal costs.

   (ii) ***In the absence of changes in preferences, any given change in optimizing households' economic environment will induce them to alter their resource allocation plans, if, and only if, the change in the economic environment changes wealth and/or pertinent relative prices (or opportunity costs).***

(a) Use whatever combination of graphical and other exposition you deem appropriate to convincingly prove or demonstrate that the representative household's intertemporal allocation of consumption will be consistent with principle (i) above. **(20 points)**

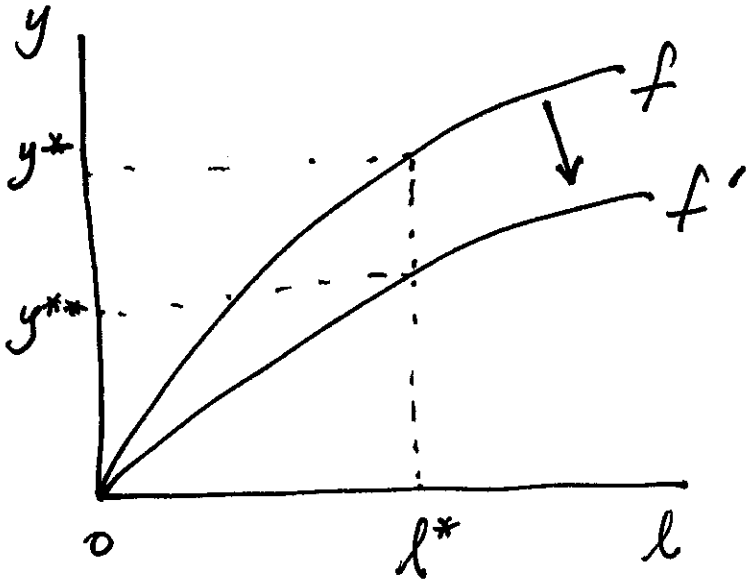
See key to #2 of SP 2015 pre-midterm

(b) Use whatever combination of graphical and other exposition you deem appropriate to convincingly prove or demonstrate that an optimizing household's intertemporal allocation of work effort will be consistent with principle (i) above. **(20 points)**

See key to # 1(a) of SP 2015 pre-midterm

(c) Suppose 317 land is hit by a natural disaster. Use whatever form of exposition you deem appropriate to explain how the representative optimizing household's intratemporal allocation of resources will be affected by this change in the economic environment. **(20 points)**

First, you should spend a minute thinking about the nature of this change in the economic environment. Is it positive or negative? Is it permanent or temporary? Clearly a natural disaster is negative and temporary. Since the question only requires you to explain the effects on the representative hh's intratemporal allocation of resources you should focus on the current period effects and not on any intertemporal effects. This shock or change in the economic environment will shift production function down and proportionally. i.e.



Now remind yourself of the fundamental principle that should guide your analysis. The guiding principle is that in the absence of Δes in preferences any given change in the economic environment will induce hhs to alter their resource allocation plans iff it Δes wealth and/or pertinent relative prices (or opportunity costs).

The proportional shift in the prod'n fnc illustrated on the previous page incorporates two critical Δes. These are:

(i) There is a decline in the scale of opportunities (i.e. @ the same level of w.e. (i.e. l^*) less output will be produced (i.e. y^{**} vs y^*)

Recall that we measured wealth as

$$x = y_1 + \frac{y_2}{(1+R)} + \frac{y_3}{(1+R)^2} + \cdots + \frac{b_0(1+R)}{P_1}$$

In this case $\Delta y_1 < 0$ & $\Delta y_2 = \Delta y_3 = \cdots = 0$. So wealth falls. Note that permanent income does not ↓ by much and that the applicable MPC is $MPC/_{\text{#temp}}$. This implies that changes in cons of the comm and consumption of leisure will be relatively small.

We know that when wealth falls hhs will reduce their cons activities (i.e. cons of goods & cons of leisure). As such, the ~~effect~~ reduction in wealth will induce the hh to ↓ c_t & ↑ l_t (since leisure ↓).

(ii) The slope of the prodn fnc at any given level of w.e. (i.e. l) is interpreted as the MPL @ that level of w.e. The proportional downward shift in the prodn fnc illustrated in the diagram means that the slope of the prodn fnc (i.e. the MPL) is now smaller @ every possible level of work effort (i.e. l). The MPL is the opportunity cost of leisure or the real return to work. When MPL ↓, consumption of leisure is now relatively cheaper than cons of goods. In response households will substitute cons of leisure for cons of goods (or the comm). This means that leisure ↑ (so work effort ↓) and that cons of good ↓. These responses to the Δ in the MPL are call substitution effects.

The overall or net effects on the hh's intratemporal allocation of resources may be summarized as.

	W.E.	S.E.	Overall or Net Eff
Consumption of commodity	↓	↓	↓
Work effort	↑	↓	ambiguous: depends on which effect is dominant.

2. Policy makers in 317land believe that their economy is currently afflicted by insufficient demand and would like to correct the problem by stimulating current period consumption expenditures by $1500 per tax payer. In pursuit of this goal they are considering two alternative approaches. Under the first approach (Approach A) each taxpayer would receive a check for a given amount in the current period and in all subsequent periods. Under the alternative approach (Policy B) each taxpayer would receive a one time payment in the current period. Assume that the real interest rate in 317land is 2.5 percent and that the permanent income hypothesis accurately describes consumption behavior in 317land.

(a) **Thoroughly derive** the marginal propensity that would be applicable under approach A and use it to develop a recommendation about the amount that should be paid to each taxpayer in each period to stimulate current consumption by $1500 per taxpayer. **(20 points)**

See derivation of $MPC|_{perm}$ in key to # 3(a) of SP 2015 pre-midterm

(b) **Thoroughly derive** the marginal propensity that would be applicable under approach B and use it to develop a recommendation about the amount that should be paid to each taxpayer in the current period in order to stimulate current consumption by $1500 per taxpayer. **(20 points)**

See derivation of $MPC|_{temp}$ in key to #3(b) of SP 2015 pre-mid term. Your derivation should have led to $MPC|_{temp} = \frac{R}{1+R}$. Since you were given $R = .025$, $MPC|_{temp} = \frac{.025}{1.025}$

$= .0244$

$MPC|_{temp} = \frac{\Delta C_t}{\Delta y_t}$. $\therefore \frac{\Delta C_t}{\Delta y_t} = .0244$

The government wants current cons ~~i.e. C_t~~ to ↑ by #1500 so $\Delta C_t = 1500$

So we have

$\frac{1500}{\Delta y_t} = .0244$. Solve for Δy_t to get $\Delta y_t = \frac{\$1500}{.0244} = \$61,475.41$